Hand Held Tools for Navigating Information

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30 Word Summary

Two mechanical interfaces, one concrete, one highly abstract, control computer graphics, not simply to produce a pretty picture, but to forge a deeper understanding of the subject matter.

Introduction

If computers are tools for manipulating information, they have been notoriously poor at using the hands of the people who use them. By engaging the hands of the user, it is possible to get a literal handle on complex visualizations of information. Our goal is to design a more practical, productive and fluid kind of interface.

A Mathematical Twist

This project was inspired by a model of a hyperbolic paraboloid in the Collection of Historical Scientific Instruments at Harvard University. Built of brass and wood, with strings held taught by lead weights, it allowed students to create and examine a variety of hyperbolic paraboloids. We built a scale model with potentiometers mounted at key mechanical points. The change in resistance at those points is used to determine the state of the model as users modify it in real time. On the computer display, a synthetic model is shown along with dynamic equations which show how variables such as volume and surface area change in tandem with the model.

The goal is to match the real and virtual model smoothly so that that the user feels as if they are the same object. Future work on this project will include using better graphic representations of the underlying math in the virtual space which should clarify the connection between the form and the equation.
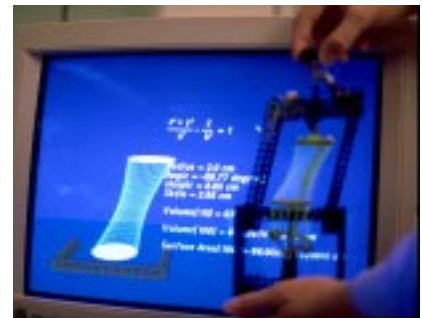
The model above can be used to form a family of hyperbolic paraboloids. By pulling the handle at the top, the height of the model changes. Twisting the tire changes the amount of curvature. In addition the top assembly is free to pivot left and right which skews the model. Wires lead from potentiometers to the connector unit at the bottom which snaps into a standard LEGO computer interface.

Talmudic Typography

The Talmud is a collection of sacred writings on the Torah or old testament. This project was built around an essay by the philosopher Emmanuel Levinas whose commentary on a tract of the Talmud, which itself is a complex, nested series of references to the Torah, forms an intricate web of text and connections. This style of writing is called hermeneutics, the use of scripture to support an argument.

A visual representation of these interconnected texts should construct a space for discussion and argument in which scholars can pull and push the words as they dissect the intellectual issues posed by the text. A set of generic interface units was designed which are attached to various parameters of the graphic visualization of the text.

These interface modules consisted of sliders, single-turn dials and ten-turn precision counting dials. The Talmud is traditionally read by two people so that it can be argued and debated. The controls were designed to facilitate this style of polemic. While discussing some fine point of logic, either of the readers can grab a control and modify the visual relationships between the texts in order to support their argument. The precision ten-turn dials, for example, are used to dial up scripture by book, chapter and verse. While the dials do not literally correspond to any physical aspect of the Torah, they allow the user to control the appropriate conceptual chunks of information.

Conclusion

If you hold a hammer in your hand, everything in the world begins to resemble a nail. Likewise, we tend to get stuck in the conventional mouse-windows paradigm. By designing new interfaces we can bridge the gap between the space people inhabit in front of the computer and the abstract landscapes inside the computer.

The yellow control is a precision ten-turn potentiometer, with detents at each full revolution. Three of these controls are used to dial up references by book, chapter and verse. The red control is a linear slider and modifies the realtionship between the Levinas and Talmudic texts.. Each control can snap in and be used to vary any parameter.